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ABSTRACT

This document, which reflects Mississippi's statutory requirement that instructional programs be based on core curricula and performance-based assessment, contains outlines of the instructional units required in local instructional management plans and daily lesson plans for automotive body repair I and II. Presented first are a program description and course outlines. Section I contains curriculum frameworks for both courses, and section II contains outlines of the instructional units required in each course. The six units of the first course cover the following topics: (1) introduction and safety; (2) basic tool usage and safety; (3) body and frame construction components; (4) principles of welding; (5) basic sheet metal repair; and (6) preparing for finishing. The six units of the second course cover these additional topics: (1) safety review; (2) hardware, glass, fasteners, and trim; (3) body and frame construction; (4) welding and cutting applications; (5) major damage repair; and (6) refinishing and detailing. Each unit includes suggested time on tasks, competencies and objectives, teaching strategies, assessment strategies, and resources. Recommended tools and equipment are listed in section III. Appended are lists of related academic topics and workplace skills for the 21st century and student competency profiles for both courses. (KC)

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Mississippi Curriculum Framework for Automotive Body Repair

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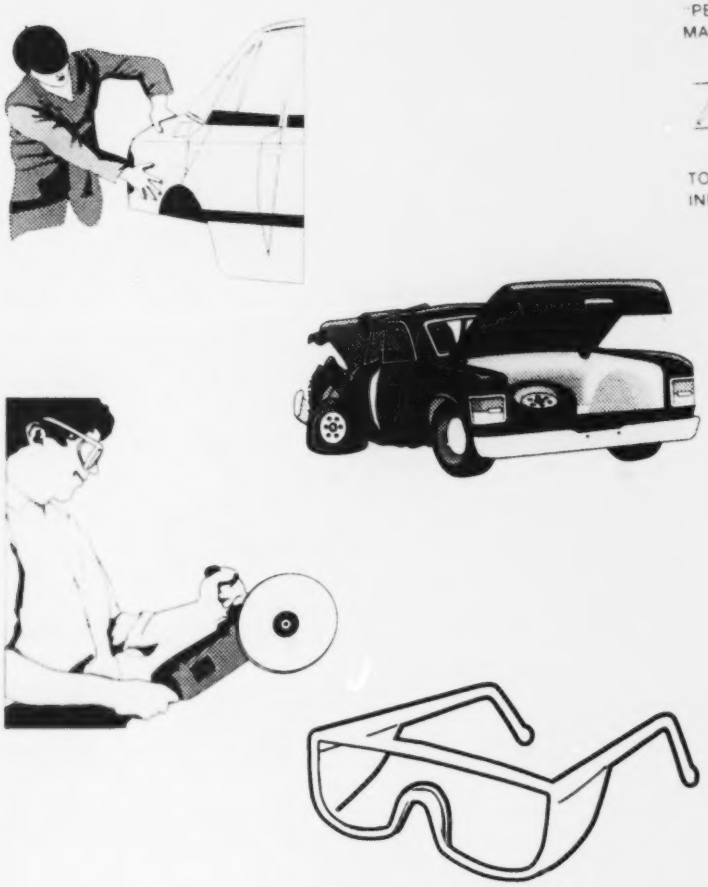

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MISSISSIPPI

CURRICULUM FRAMEWORK

FOR

AUTOMOTIVE BODY REPAIR

(PROGRAM CIP: 47.0603-Auto/Automotive Body Repairer)

July 30, 1996

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FOREWORD

The courses in this document reflect the following statutory requirements as found in Section 37-3-49, Mississippi Code of 1972, as amended:

> The State Department of Education shall provide an instructional program and establish guidelines and procedures for managing such programs in the public schools as part of the State Program of Educational Accountability and Assessment of Performance. . .
>
> The department shall provide that such program or guidelines . . . are enforced through the performance-based accreditation system.
>
> The local school board must adopt the objectives that will form the core curriculum that will be systematically delivered throughout the district.
>
> Standards for student performance must be established for each core objective in the local program and those standards establish the district's definition of mastery for each objective.
>
> There shall be an annual review of student performance in the instructional program against locally established standards.

Each secondary vocational-technical course consists of a series of instructional units which focus on a common theme. All units have been written using a common format which includes the following components:

- Unit Number and Title
- Suggested Time on Task - The number of days of instruction that should be required to teach the competencies and objectives of the unit. For secondary occupational programs, a "day" represents a two-period block of instruction.
- Competencies and Suggested Objectives
  - A **Competency** represents a general concept of performance that students are expected to master as a requirement for satisfactorily completing a unit. Students will be expected to master all competencies in the curriculum framework in order to satisfactorily complete the course.
  - The **Suggested Objectives** represent the enabling and supporting knowledge and performances that will indicate mastery of the competency.
- Suggested Teaching Strategies - This section of each unit indicates strategies that can be used to enable students to master each suggested objective. Teachers should feel free to modify or enhance these suggestions based on needs of their students and resources available in order to provide optimum learning experiences for their students.

- Suggested Assessment Strategies - This section indicates strategies that can be used to measure student mastery. Examples of suggested strategies could include classroom discussions, laboratory exercises, and student assignments. Again, teachers should feel free to modify or enhance these suggested assessment strategies based on local needs and resources.
- Suggested Resources - This section indicates some of the primary instructional resources that may be used to teach the competencies and suggested objectives. Again, these resources are suggested and the list may be modified or enhanced based on needs and abilities of students and on available resources.

The following guidelines were used in developing the curriculum framework in this document and should be considered in developing local instructional management plans and daily lesson plans:

- The content of the courses in this document reflects approximately 75 percent of the time allocated to each course. For a one-year course, this means that the content of the existing units of instruction should represent approximately 135 days of instruction. The remaining 25 percent of each course should be developed at the local district level and may reflect:
  - Additional units of instruction within the course related to topics not found in the state framework.
  - Activities which develop a higher level of mastery on the existing competencies and suggested objectives.
  - Activities and instruction related to new technologies and concepts that were not prevalent at the time the current framework was developed/revised.
  - Activities which implement components of the Mississippi Tech Prep Initiative, including integration of academic and vocational-technical skills and coursework, school-to-career transition activities, and articulation of secondary and postsecondary vocational-technical programs.
  - Individualized learning activities, including work site learning activities, to better prepare individuals in the courses for their chosen occupational area.
- Sequencing of the units of instruction within a course is left to the discretion of the local district. Naturally, foundation units related to topics such as safety, tool and equipment usage, and other fundamental skills should be taught first. Other units related to specific skill areas in the course, however, may be sequenced to take advantage of seasonal and climatic conditions, resources located outside of the school, and other factors.

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PROGRAM DESCRIPTION

AUTOMOTIVE BODY REPAIR
(Program CIP: 47.0603 - Auto/Automotive Body Repairer)

Automotive Body Repair I is an instructional program that orients an individual to the field of automotive body repair. Automotive Body Repair II is a continuation of Automotive Body Repair I and allows an individual to prepare for employment or continued education in the occupation of automotive body repair.

COURSE OUTLINE

AUTOMOTIVE BODY REPAIR I

Unit No.	Unit Name	Number of Days
Unit 1:	Introduction and Safety	10
Unit 2:	Basic Tool Usage and Safety	10
Unit 3:	Body and Frame Construction Components	10
Unit 4:	Principles of Welding	5
Unit 5:	Basic Sheet Metal Repair	50
Unit 6:	Preparing for Refinishing	50

AUTOMOTIVE BODY REPAIR II

Unit No.	Unit Name	Number of Days
Unit 1:	Safety (Review)	5
Unit 2:	Hardware, Glass, Fasteners, and Trim	10
Unit 3:	Body and Frame Construction	10
Unit 4:	Welding and Cutting Applications	10
Unit 5:	Major Damage Repair	50
Unit 6:	Refinishing and Detailing	50

SECTION I:

CURRICULUM FRAMEWORK

FOR

AUTOMOTIVE BODY REPAIR

CURRICULUM FRAMEWORK

Course Name: Automotive Body Repair I

Course CIP Code: 47.0603

Course Description: Automotive Body Repair I is an instructional program that orients an individual to the field of automotive body repair. This course allows an individual to prepare for employment or continued education in the occupation of automotive body repair. Topics include Introduction and Safety, Basic Tool Usage and Safety, Body and Frame Construction Components, Principles of Welding, Basic Sheet Metal Repair, and Preparing for Refinishing. (2-2½ Carnegie Units, depending upon time spent in the course)

Competencies and Suggested Objectives:

1. Explain career opportunities for persons in automotive body repair.
   a. Describe the occupational outlook for automotive body technicians including employment opportunities, income, and changing technology.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M7
   Workplace Skills (See Appendix B) : WP1, WP2, WP3, WP6
2. Explain general shop safety requirements.
   a. Associate the Federal safety colors with their applications including red, green, yellow, black, white, orange, and blue.
   b. Match fire extinguishers to the classes of fire each is best suited to extinguish including Class A (wood), Class B (flammable liquid), and Class C (electrical), and Class D (flammable metals).
   c. Describe state eye safety law, including appropriate times for wearing safety glasses.
   d. Describe rules for personal and general shop safety related to automotive body repair including hygiene, clothing, avoidance of horseplay, shop housekeeping, ventilation, safety equipment, location of fire safety and first aid equipment, shop layout, lifting and hoisting devices, vehicles, flammable liquids, hazardous materials, and pertinent safety codes.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6,S4, S5, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Describe procedures for dealing with hazardous materials.
   a. Describe the "Right to Know Laws and Regulations" regarding hazardous materials contact.
   b. Describe methods for reducing hazardous waste including (1) substitute non-hazardous materials, (2) recycle waste, (3) re-use product, (4) use only amount of product needed, and (5) avoid stockpiling.

c. Identify general procedures for storing hazardous materials and wastes including the following: (1) make sure that all containers are properly labeled at all times, (2) mark all containers containing hazardous waste materials with the words "**HAZARDOUS WASTE**" and with the date that the container was first used to store the waste, (3) store wastes and materials as described by the manufacturer, (4) make sure that containers are intact and secure at all times, and (5) keep all containers closed securely except when being filled or emptied.
d. Identify the informational sections found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.
e. Describe general first aid procedures to follow in case of an accident involving hazardous materials: (1) move the victim to fresh air; (2) check the container label, Material Safety Data Sheet, or other source for first aid procedures and begin first aid at once; (3) contact the person designated to help with first aid and evacuation procedures; (4) call an ambulance; (5) follow instructions from the designated person concerning further first aid and evacuation measures; (6) remain with the person until the ambulance arrives; (7) attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.
f. Identify safety equipment to be used with hazardous materials including protection for eyes, respiratory system, body, and hands.
g. Describe steps to follow in handling spills and waste disposal including (1) evacuate the area, (2) read container label, (3) call fire department (if flammable), (4) call manufacturer for clean-up instructions, (5) check Fingertip Retrieval System (FRS) Manual, (6) use proper protection equipment, and (7) contain the flow of waste.
h. Identify agencies to be contacted in case of an accident or for more information on hazardous materials including National Response Center, EPA Regional Office, and Mississippi Department of Natural Resources.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, S4, S5, S8

Workplace Skills (See Appendix B): WP4, WP6

4. Explain the programs and activities of VICA which are beneficial to students in automotive body repair.
   a. Explain purposes of the Vocational Industrial Clubs of America (VICA) including development of common bond of fellowship and preparation for leadership in the world of work.
   b. Describe activities available to students in automotive body repair including competitions, leadership development program, club meetings, fund raisers, field trips, elected office leadership positions, and service projects.

Related Academic Topics (See Appendix A): C3, C4

Workplace Skills (See Appendix B): WP3, WP6

5. Explain the safe use of general hand tools used in automotive body repair.
   a. Identify general hand tools used in automotive body repair including wrenches, screwdrivers, pliers, hammers, chisels, body hammers, slide hammers, pull rods, suction cups, and dollies.
   b. Identify hand tools used for body filling and shaping including surform (cheese grader), bondo spreader (squeegee), and sanding blocks.
   c. Identify hand tools used for special body work including pop rivet gun, door handle removal tools, windshield knife, and interior and exterior trim removal tools.
   d. Identify types of eye safety protection including goggles, glasses, shields, welding goggles, and welding helmet.

   Related Academic Topics (See Appendix A): C1, C2, C4
   Workplace Skills (See Appendix B): WP5
6. Explain the safe use of power tools and stationary equipment.
   a. Identify and describe the safe use of hand-operated power tools including paint sprayer, pneumatic grinders, sanders, drills, and files.
   b. Identify and describe the safe use of portable and stationary power equipment including hydraulic body jacks, spray booth, frame alignment and straightening equipment, floor jacks, hoists, and drill press.

   Related Academic Topics (See Appendix A): C1, C2, C4
   Workplace Skills (See Appendix B): WP5, WP6
7. Explain components of automotive body construction.
   a. Identify components of the front-end assembly including fender, trim, molding, skirt, battery tray, hood, hood hinge, hood lock, hood catch, tie bar, stone shield, bumper radiator, shroud, and radiator support.
   b. Identify types of suspensions including control arm and McPherson strut systems.
   c. Identify major panels and components including front cowl, door section components, floor panel sections, rocker panel and pillar components, roof components, and rear body assembly.
   d. Describe types of frame construction including unitized and conventional.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6
   Workplace Skills (See Appendix B): WP2, WP6
8. Describe body and frame components using automotive reference texts and collision repair manuals.
   a. Identify body and frame components using automotive reference texts, collision repair manuals, and computerized collision repair software.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6
   Workplace Skills (See Appendix B): WP2, WP6
9. Explain safe use of oxyacetylene cutting equipment.
   a. Describe welding safety rules including protection of eyes, body, hands, and feet and prevention of fire hazards.
   b. Identify components of oxyacetylene cutting equipment including the major parts of the tanks, hoses, regulators, and torch body.

c. Compare the differences between flashback and backfire including the sound produced and flame behavior of each.
d. Describe the steps to follow in case of flashback.

Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S4, S8
Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6

10. Utilize oxyacetylene cutting equipment.
    a. Set up equipment for oxyacetylene cutting, including tanks, regulators, hoses, torch body, and tip selection.
    b. Turn on, light, adjust, and turn off oxyacetylene welding equipment including adjustment for carburizing, oxidizing, and neutral flames.
    c. Operate oxyacetylene cutting equipment to cut mild steel according to industry standards.

    Related Academic Topics (See Appendix A): C3, C4, C5, C6
    Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6
11. Explain the principles of operation of gas metal arc welding (GMAW).
    a. Identify the major components of a gas metal arc welding (GMAW) unit including flowmeter, shielding, timing and control panel, power supply, wire-feed system, torch gun, trigger, and ground.
    b. Demonstrate the operation of GMAW equipment, including starting of an arc and maintaining a bead.
    c. Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.

    Related Academic Topics (See Appendix A): C3, C4, C5, C6, S8
    Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6
12. Explain procedures for identifying damage and plans for repair of sheet metal.
    a. Describe the steps in assessing and repair of automotive body metal damage according to the order of performance.
    b. Identify classes of metal damage including buckle, wrinkle, and gouge.
    c. Describe the purpose of preparing a surface for metal repair including why the surface must be clean.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6
    Workplace Skills (See Appendix B): WP4, WP5, WP6
13. Apply the procedures for repair of damaged sheet metal.
    a. Prepare exterior and interior metal surfaces for repair including the amount of surface that should be prepared on an exterior and an interior panel surface according to industry practices and specifications.
    b. Describe the effects of bending automotive body sheet metal including strengthening and weakening of the sheet metal panel.
    c. Bump out a panel using a hammer and dolly and bumping or slapping spoon according to industry standards.
    d. Identify grinding techniques used in metal finishing including the patterns used to promote adhesion.

Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6
Workplace Skills (See Appendix B): WP4, WP5, WP6

14. Demonstrate basic techniques used in metal finishing according to industry standards.
    a. Interpret safety rules for using body fillers including protective clothing, procedures, and cautions.
    b. Describe guidelines for mixing and applying body fillers including mixing ratios, mixing procedures, and shop temperature.
    c. Prepare a steel metal panel and use plastic body filler to repair the panel according to industry standards.

    Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M4
    Workplace Skills (See Appendix B): WP4, WP5, WP6
15. Apply procedures for sanding and grit selection.
    a. Describe the purposes of sanding including promotion of adhesion and removal of rough surfaces.
    b. Select appropriate grit for the finish being applied.
    c. Describe the purpose of featheredging including tapering of broken paint and sanding scratches.
    d. Compare the characteristics of wet and dry sanding including dust, paper clog, panel inspection, sanding scratches, and speed of masking.
    e. Describe guidelines for hand sanding including sanding in one direction, use of sanding block, and application of even pressure.
    f. Featheredge broken paint according to industry standards.
    g. Wet sand for a complete paint job according to industry standards.
    h. Dry sand for a complete paint job according to industry standards.
    i. Scuff-sand a surface according to industry standards.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S8
    Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6
16. Apply procedures for masking.
    a. Describe guidelines for effective use of masking tape and paper including application and removal.
    b. Mask a vehicle for panel or a complete paint job according to industry standards.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6
    Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6

CURRICULUM FRAMEWORK

Course Name: Automotive Body Repair II

Course CIP Code: 47.9990

Course Description: Automotive Body Repair II is a continuation of Automotive Body Repair I. This course allows an individual to prepare for employment or continued education in the occupation of automotive body repair. Topics include Safety (Review); Hardware, Glass, Fasteners, and Trim; Body and Frame Construction; Welding and Cutting Applications; Major Damage Repair; and Refinishing and Detailing. (2-2½ Carnegie Units, depending upon time spent in the course)

Competencies and Suggested Objectives:

1. Explain general shop safety requirements.
   a. Associate the Federal safety colors with their applications including red, green, yellow, black, white, orange, and blue.
   b. Match fire extinguishers to the classes of fire each is best suited to extinguish including Class A (wood), Class B (flammable liquid), and Class C (electrical), and Class D (flammable metals).
   c. Describe state eye safety law, including appropriate times for wearing safety glasses.
   d. Describe rules for personal and general shop safety related to automotive body repair including hygiene, clothing, avoidance of horseplay, shop housekeeping, ventilation, safety equipment, location of fire safety and first aid equipment, shop layout, lifting and hoisting devices, vehicles, flammable liquids, hazardous materials, and pertinent safety codes.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, S4, S5, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Describe procedures for dealing with hazardous materials.
   a. Describe the "Right to Know Laws and Regulations" regarding hazardous materials contact.
   b. Describe methods for reducing hazardous waste including (1) substitute non-hazardous materials, (2) recycle waste, (3) re-use product, (4) use only amount of product needed, and (5) avoid stockpiling.
   c. Identify general procedures for storing hazardous materials and wastes including the following: (1) make sure that all containers are properly labeled at all times, (2) mark all containers containing hazardous waste materials with the words **"HAZARDOUS WASTE"** and with the date that the container was first used to store the waste, (3) store wastes and

materials as described by the manufacturer, (4) make sure that containers are intact and secure at all times, and (5) keep all containers closed securely except when being filled or emptied.

d. Identify the informational sections found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.
e. Describe general first aid procedures to follow in case of an accident involving hazardous materials: (1) move the victim to fresh air; (2) check the container label, Material Safety Data Sheet, or other source for first aid procedures and begin first aid at once; (3) contact the person designated to help with first aid and evacuation procedures; (4) call an ambulance; (5) follow instructions from the designated person concerning further first aid and evacuation measures; (6) remain with the person until the ambulance arrives; (7) attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.
f. Identify safety equipment to be used with hazardous materials including protection for eyes, respiratory system, body, and hands.
g. Describe steps to follow in handling spills and waste disposal including (1) evacuate the area, (2) read container label, (3) call fire department (if flammable), (4) call manufacturer for clean-up instructions, (5) check Fingertip Retrieval System (FRS) Manual, (6) use proper protection equipment, and (7) contain the flow of waste.
h. Identify agencies to be contacted in case of an accident or for more information on hazardous materials including National Response Center, EPA Regional Office, and Mississippi Department of Natural Resources.

Related Academic Topics (See Appendix A): C3, C4
Workplace Skills (See Appendix B): WP3, WP6

3. Explain automotive hardware, glass, fasteners and trim.
   a. Identify typical interior door components and hardware including door handle, door rest, side mirror regulator, window regulator, door knob lock, weather strip, ash tray, and door latch.
   b. Identify typical door glass hardware including regulator, control arms, and glass track.
   c. Identify the weather stripping on a door including how the weather stripping seals the interior from outside elements.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4
   Workplace Skills (See Appendix B): WP2, WP4
4. Apply procedures for disassembly and assembly of manual doors.
   a. Describe the methods used for mounting interior handles including clip-attached and screw-attached types.
   b. Remove and replace interior door trim panel according to manufacturer's specifications using door trim tools.

   Related Academic Topics (See Appendix A): C1, C3, C4
   Workplace Skills (See Appendix B): WP2, WP3, WP4, WP5,WP6

5. Explain procedures to repair body and frame construction.
   a. Identify major parts of unitized and conventional frames including: (1) unitized parts such as header bar, windshield, pillar, strut tower, front rail, front body, hinge pillar, rocker panel, and center panel and (2) conventional parts such as stud frame section, front cross member, side rail, and rear cross member.
   b. Describe the different types of frame and unitized body damage including diamond, twist, sag, and sway.
   c. Identify the frame repair control points including front, center, and rear.

   Related Academic Topics (See Appendix A): C1, C2, C4, C6
   Workplace Skills (See Appendix B): WP2, WP3, WP6
6. Explain the components of gas metal arc welding (GMAW).
   a. Identify the major components of a GMAW welding unit including solid wire electrode, gas cylinder, timing and control panel, power supply, wire-feed system, torch gun, and ground clamp.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C6, S5, S8
   Workplace Skills (See Appendix B): WP2, WP4
7. Operate a GMAW system.
   a. Set up a spool-type wire feeder for GMAW welding according to industry standards.
   b. Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.
   c. Set up a flowmeter regulator for GMAW shielding gases according to industry standards.
   d. Use a GMAW welder to lay stringer beads, construct a fillet weld, plug weld, and weld a lap joint on automotive type steel.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, S5, S8
   Workplace Skills (See Appendix B): WP2, WP4
8. Set up and operate a plasma arc cutter (PAC).
   a. Identify the major components of a PAC.
   b. Adjust airflow and temperature settings.
   c. Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.
   d. Operate a PAC to cut automotive body sheet metal.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, S5
   Workplace Skills (See Appendix B): WP2, WP4
9. Explain choices or options for correction of structural panel damage.
   a. Describe options for repair, replace, or total for correction of structural panel damage.

   Related Academic Topics (See Appendix A): C1, C3, M1
   Workplace Skills (See Appendix B): WP2

10. Explain procedures for heat treating sheet metal panels.
    a. Interpret guidelines for heat shrinking sheet metal including the manufacturer's recommendations for high strength steels.
    b. Observe the proper method for heat shrinking sheet metal according to industry standards.

    Related Academic Topics (See Appendix A): C1, C2, M4, S6
    Workplace Skills (See Appendix B): WP4
11. Explain procedures for repairing major damage.
    a. Describe the different types of structural panel assembly methods.
    b. Describe methods for removing welded panels including a drill, air chisel, saws, and spot weld cutter.
    c. Remove and reinstall bolted on assemblies, including door, trunk lid, and hood.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, M4
    Workplace Skills (See Appendix B): WP5, WP6
12. Apply procedures to perform fiberglass and plastic repairs.
    a. Describe safety precautions to observe when working with fiberglass including wear of rubber gloves and a respirator, work in a well-ventilated area, have fire extinguisher on standby, mix only amount needed, read all instructions on labels, and use thinners with caution.
    b. Describe the advantages of fiberglass in automotive body construction.
    c. Describe the two types of plastics and repair procedures including thermoset plastic and thermoplastic.
    d. Perform a fiberglass repair.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, M4, M7, S5
    Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
13. Apply procedures for alignment of body panels.
    a. Describe the purpose of aligning detachable parts including proper panel gap, seal, and fit.
    b. Align a body panel according to manufacturer's specifications.

    Related Academic Topics (See Appendix A): C1, C2, C3, C5, C6
    Workplace Skills (See Appendix B): WP4, WP5, WP6
14. Apply procedures for spray painting.
    a. Describe general safety rules for using spray paint equipment including reading labels, safe use of the compressor, avoiding contact with bare skin, turning off power before servicing, using correct electrical outlets, wearing protective clothing and respirator, and proper ventilation requirements.
    b. Describe the tools and equipment used in automotive refinishing including spray gun, blow gun, air regulator, air compressor, paint paddle, viscosity cup, paint strainer, apron taper, paint booth, and panel drying system.
    c. Identify the parts of a spray gun including air cap, fluid tip, needle valve, fluid adjustment screw, fan adjustment screw, and body.

d. Set up a spray gun: (1) thin the paint; (2) fill the spray gun; and (3) set for correct pressure, fan pattern, and fluid flow according to manufacturer's specifications and industry standards.
e. Clean a spray gun according to manufacturer's specifications.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M4, S5, S8
Workplace Skills (See Appendix B): WP4, WP5

15. Explain different types of paints and undercoatings.
    a. Describe the different types of paint undercoats and guidelines for quality undercoating including primer, primer surfacer, primer sealer, non-sanding sealers, and etching primers.
    b. Describe procedures for quality undercoating according to industry standards.
    c. Describe the types of finishes used on today's vehicles including acrylic, enamel, urethane, and acrylic urethane.
    d. Describe the different types of coat application techniques including mist coat, single coat, medium wet coat, double coat, and banding coat.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S5
    Workplace Skills (See Appendix B): WP2, WP4
16. Perform application of paints and undercoatings.
    a. Describe guidelines for preventing dirty paint including keeping vehicle clean, wetting paint booth floor, using clean equipment, wearing clean clothes, using clean gun, and using clean masking materials.
    b. Mix and apply a primer-surfacer, guide coat, and sealer according to manufacturer's specifications.
    c. Participate in a complete paint job according to industry standards and paint manufacturer's specifications.
    d. Measure paint thickness using a mil gauge.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, M1, M4, S5
    Workplace Skills (See Appendix B): WP4, WP5
17. Apply automotive detailing procedures.
    a. Describe safety precautions to observe when using volatile cleaners including wearing gloves, safety glasses, particle mask, and protective clothing and having a well-ventilated area.
    b. Detail a complete body paint job according to industry standards and instructor's satisfaction.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S5
    Workplace Skills (See Appendix B): WP2, WP3, WP4, WP5, WP6

SECTION II:

CURRICULUM GUIDE

FOR

AUTOMOTIVE BODY REPAIR

AUTOMOTIVE BODY REPAIR I

AUTOMOTIVE BODY REPAIR I
UNIT 1: INTRODUCTION AND SAFETY **(10 days)**

Competencies and Suggested Objectives:

1. Explain career opportunities for persons in automotive body repair.
   a. Describe the occupational outlook for automotive body technicians including employment opportunities, income, and changing technology.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M7
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP6
2. Explain general shop safety requirements.
   a. Associate the Federal safety colors with their applications including red, green, yellow, black, white, orange, and blue.
   b. Match fire extinguishers to the classes of fire each is best suited to extinguish including Class A (wood), Class B (flammable liquid), and Class C (electrical), and Class D (flammable metals).
   c. Describe state eye safety law, including appropriate times for wearing safety glasses.
   d. Describe rules for personal and general shop safety related to automotive body repair including hygiene, clothing, avoidance of horseplay, shop housekeeping, ventilation, safety equipment, location of fire safety and first aid equipment, shop layout, lifting and hoisting devices, vehicles, flammable liquids, hazardous materials, and pertinent safety codes.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6,S4, S5, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Describe procedures for dealing with hazardous materials.
   a. Describe the "Right to Know Laws and Regulations" regarding hazardous materials contact.
   b. Describe methods for reducing hazardous waste including (1) substitute non-hazardous materials, (2) recycle waste, (3) re-use product, (4) use only amount of product needed, and (5) avoid stockpiling.
   c. Identify general procedures for storing hazardous materials and wastes including the following: (1) make sure that all containers are properly labeled at all times, (2) mark all containers containing hazardous waste materials with the words **"HAZARDOUS WASTE"** and with the date that the container was first used to store the waste, (3) store wastes and materials as described by the manufacturer, (4) make sure that containers are intact and secure at all times, and (5) keep all containers closed securely except when being filled or emptied.
   d. Identify the informational sections found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.

e. Describe general first aid procedures to follow in case of an accident involving hazardous materials: (1) move the victim to fresh air; (2) check the container label, Material Safety Data Sheet, or other source for first aid procedures and begin first aid at once; (3) contact the person designated to help with first aid and evacuation procedures; (4) call an ambulance; (5) follow instructions from the designated person concerning further first aid and evacuation measures; (6) remain with the person until the ambulance arrives; (7) attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.
f. Identify safety equipment to be used with hazardous materials including protection for eyes, respiratory system, body, and hands.
g. Describe steps to follow in handling spills and waste disposal including (1) evacuate the area, (2) read container label, (3) call fire department (if flammable), (4) call manufacturer for clean-up instructions, (5) check Fingertip Retrieval System (FRS) Manual, (6) use proper protection equipment, and (7) contain the flow of waste.
h. Identify agencies to be contacted in case of an accident or for more information on hazardous materials including National Response Center, EPA Regional Office, and Mississippi Department of Natural Resources.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, S4, S5, S8

Workplace Skills (See Appendix B): WP4, WP6

4. Explain the programs and activities of VICA which are beneficial to students in automotive body repair.
   a. Explain purposes of the Vocational Industrial Clubs of America (VICA) including development of common bond of fellowship and preparation for leadership in the world of work.
   b. Describe activities available to students in automotive body repair including competitions, leadership development program, club meetings, fund raisers, field trips, elected office leadership positions, and service projects.

Related Academic Topics (See Appendix A): C3, C4

Workplace Skills (See Appendix B): WP3, WP6

Suggested Teaching Strategies:

1. *Explain career opportunities for persons in automotive body repair.*
   a. *Discussion and media to describe the occupational outlook for automotive body technicians including employment opportunities, income, and changing technology.*
2. *Explain general shop safety requirements.*
   a. *Assist students to associate the Federal safety colors with their applications including red, green, yellow, black, white, orange, and blue.*

b. *Show the students which fire extinguishers are best suited to extinguish which class of fire including Class A (wood), Class B (flammable liquid), and Class C (electrical), and Class D (flammable metals).*
c. *Discussion and media to describe state eye safety law, including appropriate times for wearing safety glasses.*
d. *Discussion and media to describe rules for personal and general shop safety related to automotive body repair including hygiene, clothing, avoidance of horseplay, shop housekeeping, ventilation, safety equipment, location of fire safety and first aid equipment, shop layout, lifting and hoisting devices, vehicles, flammable liquids, hazardous materials, and pertinent safety codes.*

3. *Describe procedures for dealing with hazardous materials.*
   a. *Describe the "Right to Know Laws and Regulations" regarding hazardous materials contact.*
   b. *Describe methods for reducing hazardous waste including (1) substitute non-hazardous materials, (2) recycle waste, (3) re-use product, (4) use only amount of product needed, and (5) avoid stockpiling.*
   c. *Demonstrate procedures to identify general procedures for storing hazardous materials and wastes including the following: (1) make sure that all containers are properly labeled at all times, (2) mark all containers containing hazardous waste materials with the words* ***"HAZARDOUS WASTE"*** *and with the date that the container was first used to store the waste, (3) store wastes and materials as described by the manufacturer, (4) make sure that containers are intact and secure at all times, and (5) keep all containers closed securely except when being filled or emptied.*
   d. *Discussion and media to identify the informational sections found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.*
   e. *Demonstrate procedures to provide general first aid procedures to follow in case of an accident involving hazardous materials: (1) move the victim to fresh air; (2) check the container label, Material Safety Data Sheet, or other source for first aid procedures and begin first aid at once; (3) contact the person designated to help with first aid and evacuation procedures; (4) call an ambulance; (5) follow instructions from the designated person concerning further first aid and evacuation measures; (6) remain with the person until the ambulance arrives; (7) attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.*
   f. *Demonstrate safety equipment to be used with hazardous materials including protection for eyes, respiratory system, body, and hands.*
   g. *Demonstrate steps to follow in handling spills and waste disposal including (1) evacuate the area, (2) read container label, (3) call fire department (if*

flammable), (4) call manufacturer for clean-up instructions, (5) check Fingertip Retrieval System (FRS) Manual, (6) use proper protection equipment, and (7) contain the flow of waste.

h. Discussion and media to identify agencies to be contacted in case of an accident or for more information on hazardous materials including National Response Center, EPA Regional Office, and Mississippi Department of Natural Resources.

4. Explain the programs and activities of VICA which are beneficial to students in automotive body repair.

a. Discussion and media to explain purposes of the Vocational Industrial Clubs of America (VICA) including development of common bond of fellowship and preparation for leadership in the world of work.

b. Describe activities available to students in automotive body repair including competitions, leadership development program, club meetings, fund raisers, field trips, elected office leadership positions, and service projects.

Suggested Assessment Strategies:

1. Explain career opportunities for persons in automotive body repair.

a. Test - Describe the occupational outlook for automotive body technicians including employment opportunities, income, and changing technology.

2. Explain general shop safety requirements.

a. Test - Associate the Federal safety colors with their applications including red, green, yellow, black, white, orange, and blue.

b. Test - Match fire extinguishers to the classes of fire each is best suited to extinguish including Class A (wood), Class B (flammable liquid), and Class C (electrical), and Class D (flammable metals).

c. Test - Describe state eye safety law, including appropriate times for wearing safety glasses.

d. Test - Describe rules for personal and general shop safety related to automotive body repair including hygiene, clothing, avoidance of horseplay, shop housekeeping, ventilation, safety equipment, location of fire safety and first aid equipment, shop layout, lifting and hoisting devices, vehicles, flammable liquids, hazardous materials, and pertinent safety codes.

3. Describe procedures for dealing with hazardous materials.

a. Oral/written Report - Describe the "Right to Know Laws and Regulations" regarding hazardous materials contact.

b. Oral/written Report - Describe methods for reducing hazardous waste including (1) substitute non-hazardous materials, (2) recycle waste, (3) re-use product, (4) use only amount of product needed, and (5) avoid stockpiling.

c. Test - Identify general procedures for storing hazardous materials and wastes including the following: (1) make sure that all containers are properly labeled at all times, (2) mark all containers containing hazardous

*waste materials with the words **"HAZARDOUS WASTE"** and with the date that the container was first used to store the waste, (3) store wastes and materials as described by the manufacturer, (4) make sure that containers are intact and secure at all times, and (5) keep all containers closed securely except when being filled or emptied.*

d. *Test - Identify the informational sections found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.*
e. *Practical Activity - Describe general first aid procedures to follow in case of an accident involving hazardous materials: (1) move the victim to fresh air; (2) check the container label, Material Safety Data Sheet, or other source for first aid procedures and begin first aid at once; (3) contact the person designated to help with first aid and evacuation procedures; (4) call an ambulance; (5) follow instructions from the designated person concerning further first aid and evacuation measures; (6) remain with the person until the ambulance arrives; (7) attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.*
f. *Practical Activity - Identify safety equipment to be used with hazardous materials including protection for eyes, respiratory system, body, and hands.*
g. *Test - Describe steps to follow in handling spills and waste disposal including (1) evacuate the area, (2) read container label, (3) call fire department (if flammable), (4) call manufacturer for clean-up instructions, (5) check Fingertip Retrieval System (FRS) Manual, (6) use proper protection equipment, and (7) contain the flow of waste.*
h. *Test - Identify agencies to be contacted in case of an accident or for more information on hazardous materials including National Response Center, EPA Regional Office, and Mississippi Department of Natural Resources.*

4. *Explain the programs and activities of VICA which are beneficial to students in automotive body repair.*
   a. *Oral/written Report - Explain purposes of the Vocational Industrial Clubs of America (VICA) including development of common bond of fellowship and preparation for leadership in the world of work.*
   b. *Oral/written Report - Describe activities available to students in automotive body repair including competitions, leadership development program, club meetings, fund raisers, field trips, elected office leadership positions, and service projects.*

Suggested References:

American Welding Society. Safety in Welding, Cutting, and Allied Processes (Z49.1.94). Miami, FL: Author. 1994.

Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

VICA. Official Guide for VICA. Leesburg, VA: Vocational Industrial Clubs of America (VICA).

Warzecha, M. Hazardous Materials Fingertip Retrieval System. Alexandria, VA: American Vocational Association. 1991.

AUTOMOTIVE BODY REPAIR I
UNIT 2: BASIC TOOL USAGE AND SAFETY (10 days)

Competencies and Suggested Objectives:

1. Explain the safe use of general hand tools used in automotive body repair.
   a. Identify general hand tools used in automotive body repair including wrenches, screwdrivers, pliers, hammers, chisels, body hammers, slide hammers, pull rods, suction cups, and dollies.
   b. Identify hand tools used for body filling and shaping including surform (cheese grader), bondo spreader (squeegee), and sanding blocks.
   c. Identify hand tools used for special body work including pop rivet gun, door handle removal tools, windshield knife, and interior and exterior trim removal tools.
   d. Identify types of eye safety protection including goggles, glasses, shields, welding goggles, and welding helmet.

   Related Academic Topics (See Appendix A): C1, C2, C4
   Workplace Skills (See Appendix B): WP5
2. Explain the safe use of power tools and stationary equipment.
   a. Identify and describe the safe use of hand-operated power tools including paint sprayer, pneumatic grinders, sanders, drills, and files.
   b. Identify and describe the safe use of portable and stationary power equipment including hydraulic body jacks, spray booth, frame alignment and straightening equipment, floor jacks, hoists, and drill press.

   Related Academic Topics (See Appendix A): C1, C2, C4
   Workplace Skills (See Appendix B): WP5, WP6

Suggested Teaching Strategies:

1. *Explain the safe use of general hand tools used in automotive body repair.*
   a. Assist students to identify general hand tools used in automotive body repair including wrenches, screwdrivers, pliers, hammers, chisels, body hammers, slide hammers, pull rods, suction cups, and dollies.
   b. Assist students to identify hand tools used for body filling and shaping including surform (cheese grader), bondo spreader (squeegee), and sanding blocks.
   c. Assist students to identify hand tools used for special body work including pop rivet gun, door handle removal tools, windshield knife, and interior and exterior trim removal tools.
   d. Assist students to identify types of eye safety protection including goggles, glasses, shields, welding goggles, and welding helmet.

2. *Explain the safe use of power tools and stationary equipment.*
   a. *Assist students to identify and describe the safe use of hand-operated power tools including paint sprayer, pneumatic grinders, sanders, drills, and files.*
   b. *Assist students to identify and describe the safe use of portable and stationary power equipment including hydraulic body jacks, spray booth, frame alignment and straightening equipment, floor jacks, hoists, and drill press.*

Suggested Assessment Strategies:

1. *Explain the safe use of general hand tools used in automotive body repair.*
   a. *Test - Identify general hand tools used in automotive body repair including wrenches, screwdrivers, pliers, hammers, chisels, body hammers, slide hammers, pull rods, suction cups, and dollies.*
   b. *Test - Identify hand tools used for body filling and shaping including surform (cheese grader), bondo spreader (squeegee), and sanding blocks.*
   c. *Test - Identify hand tools used for special body work including pop rivet gun, door handle removal tools, windshield knife, and interior and exterior trim removal tools.*
   d. *Test - Identify types of eye safety protection including goggles, glasses, shields, welding goggles, and welding helmet.*
2. *Explain the safe use of power tools and stationary equipment.*
   a. *Practical Activity - Identify and describe the safe use of hand-operated power tools including paint sprayer, pneumatic grinders, sanders, drills, and files.*
   b. *Practical Activity - Identify and describe the safe use of portable and stationary power equipment including hydraulic body jacks, spray booth, frame alignment and straightening equipment, floor jacks, hoists, and drill press.*

Suggested References:

American Welding Society. Safety in Welding, Cutting, and Allied Processes (Z49.1.94). Miami, FL: Author. 1994.

Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

AUTOMOTIVE BODY REPAIR I
UNIT 3: BODY AND FRAME CONSTRUCTION COMPONENTS (10 days)

Competencies and Suggested Objectives:

1. Explain components of automotive body construction.
   a. Identify components of the front-end assembly including fender, trim, molding, skirt, battery tray, hood, hood hinge, hood lock, hood catch, tie bar, stone shield, bumper radiator, shroud, and radiator support.
   b. Identify types of suspensions including control arm and McPherson strut systems.
   c. Identify major panels and components including front cowl, door section components, floor panel sections, rocker panel and pillar components, roof components, and rear body assembly.
   d. Describe types of frame construction including unitized and conventional.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6
   Workplace Skills (See Appendix B): WP2, WP6
2. Describe body and frame components using automotive reference texts and collision repair manuals.
   a. Identify body and frame components using automotive reference texts, collision repair manuals, and computerized collision repair software.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6
   Workplace Skills (See Appendix B): WP2, WP6

Suggested Teaching Strategies:

1. *Explain components of automotive body construction.*
   a. *Assist students to identify components of the front-end assembly including fender, trim, molding, skirt, battery tray, hood, hood hinge, hood lock, hood catch, tie bar, stone shield, bumper radiator, shroud, and radiator support.*
   b. *Assist students to identify types of suspensions including control arm and McPherson strut systems.*
   c. *Assist students to identify major panels and components including front cowl, door section components, floor panel sections, rocker panel and pillar components, roof components, and rear body assembly.*
   d. *Assist students to describe types of frame construction including unitized and conventional.*
2. *Describe body and frame components using automotive reference texts and collision repair manuals.*
   a. *Demonstrate how to identify body and frame components using automotive reference texts, collision repair manuals, and computerized collision repair software.*

Suggested Assessment Strategies:

1. *Explain components of automotive body construction.*
   a. *Practical Activity - Identify components of the front-end assembly including fender, trim, molding, skirt, battery tray, hood, hood hinge, hood lock, hood catch, tie bar, stone shield, bumper radiator, shroud, and radiator support.*
   b. *Practical Activity - Identify types of suspensions including control arm and McPherson strut systems.*
   c. *Practical Activity - Identify major panels and components including front cowl, door section components, floor panel sections, rocker panel and pillar components, roof components, and rear body assembly.*
   d. *Oral/written Report - Describe types of frame construction including unitized and conventional.*
2. *Describe body and frame components using automotive reference texts and collision repair manuals.*
   a. *Practical Activity - Identify body and frame components using automotive reference texts, collision repair manuals, and computerized collision repair software.*

Suggested References:

Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Auto Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

Mitchell International. Mitchell Collision Manual. San Diego, CA: Author.

NATEF. (1995). Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

AUTOMOTIVE BODY REPAIR I
UNIT 4: PRINCIPLES OF WELDING **(5 days)**

Competencies and Suggested Objectives:

1. Explain safe use of oxyacetylene cutting equipment.
   a. Describe welding safety rules including protection of eyes, body, hands, and feet and prevention of fire hazards.
   b. Identify components of oxyacetylene cutting equipment including the major parts of the tanks, hoses, regulators, and torch body.
   c. Compare the differences between flashback and backfire including the sound produced and flame behavior of each.
   d. Describe the steps to follow in case of flashback.

   Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S4, S8
   Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6
2. Utilize oxyacetylene cutting equipment.
   a. Set up equipment for oxyacetylene cutting, including tanks, regulators, hoses, torch body, and tip selection.
   b. Turn on, light, adjust, and turn off oxyacetylene welding equipment including adjustment for carburizing, oxidizing, and neutral flames.
   c. Operate oxyacetylene cutting equipment to cut mild steel according to industry standards.

   Related Academic Topics (See Appendix A): C3, C4, C5, C6
   Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6
3. Explain the principles of operation of gas metal arc welding (GMAW).
   a. Identify the major components of a gas metal arc welding (GMAW) unit including flowmeter, shielding, timing and control panel, power supply, wire-feed system, torch gun, trigger, and ground.
   b. Demonstrate the operation of GMAW equipment, including starting of an arc and maintaining a bead.
   c. Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.

   Related Academic Topics (See Appendix A): C3, C4, C5, C6, S8
   Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Explain safe use of oxyacetylene cutting equipment.*
   a. *Discussion and media to describe welding safety rules including protection of eyes, body, hands, and feet and prevention of fire hazards.*
   b. *Identify components of oxyacetylene cutting equipment including the major parts of the tanks, hoses, regulators, and torch body.*

c. *Use media to demonstrate the differences between flashback and backfire including the sound produced and flame behavior of each.*
d. *Discussion and media to describe the steps to follow in case of flashback.*

2. *Utilize oxyacetylene cutting equipment.*
   a. *Present demonstration of procedures to set up equipment for oxyacetylene cutting, including tanks, regulators, hoses, torch body, and tip selection.*
   b. *Present demonstration of procedures to turn on, light, adjust, and turn off oxyacetylene welding equipment including adjustment for carburizing, oxidizing, and neutral flames.*
   c. *Present demonstration of procedures to operate oxyacetylene cutting equipment to cut mild steel according to industry standards.*
3. *Explain the principles of operation of gas metal arc welding (GMAW).*
   a. *Identify the major components of a gas metal arc welding (GMAW) unit including flowmeter, shielding, timing and control panel, power supply, wire-feed system, torch gun, trigger, and ground.*
   b. *Present demonstration of procedures to operate GMAW equipment, including starting of an arc and maintaining a bead.*
   c. *Performance exercise to demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.*

Suggested Assessment Strategies:

1. *Explain safe use of oxyacetylene cutting equipment.*
   a. *Test - Describe welding safety rules including protection of eyes, body, hands, and feet and prevention of fire hazards.*
   b. *Practical Activity - Identify components of oxyacetylene cutting equipment including the major parts of the tanks, hoses, regulators, and torch body.*
   c. *Oral/written Report - Compare the differences between flashback and backfire including the sound produced and flame behavior of each.*
   d. *Oral/written Report - Describe the steps to follow in case of flashback.*
2. *Utilize oxyacetylene cutting equipment.*
   a. *Practical Activity - Set up equipment for oxyacetylene cutting, including tanks, regulators, hoses, torch body, and tip selection.*
   b. *Practical Activity - Turn on, light, adjust, and turn off oxyacetylene welding equipment including adjustment for carburizing, oxidizing, and neutral flames.*
   c. *Practical Activity - Operate oxyacetylene cutting equipment to cut mild steel according to industry standards.*
3. *Explain the principles of operation of gas metal arc welding (GMAW).*
   a. *Practical Activity - Identify the major components of a gas metal arc welding (GMAW) unit including flowmeter, shielding, timing and control panel, power supply, wire-feed system, torch gun, trigger, and ground.*

b. Practical Activity - Demonstrate the operation of GMAW equipment, including starting of an arc and maintaining a bead.

c. Performance Activity - Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.

Suggested References:

American Welding Society. Safety in Welding, Cutting, and Allied Processes (Z49.1.94). Miami, FL: Author. 1994.

Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

AUTOMOTIVE BODY REPAIR I
UNIT 5: BASIC SHEET METAL REPAIR (50 days)

Competencies and Suggested Objectives:

1. Explain procedures for identifying damage and plans for repair of sheet metal.
   a. Describe the steps in assessing and repair of automotive body metal damage according to the order of performance.
   b. Identify classes of metal damage including buckle, wrinkle, and gouge.
   c. Describe the purpose of preparing a surface for metal repair including why the surface must be clean.

   Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6
   Workplace Skills (See Appendix B): WP4, WP5, WP6
2. Apply the procedures for repair of damaged sheet metal.
   a. Prepare exterior and interior metal surfaces for repair including the amount of surface that should be prepared on an exterior and an interior panel surface according to industry practices and specifications.
   b. Describe the effects of bending automotive body sheet metal including strengthening and weakening of the sheet metal panel.
   c. Bump out a panel using a hammer and dolly and bumping or slapping spoon according to industry standards.
   d. Identify grinding techniques used in metal finishing including the patterns used to promote adhesion.

   Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6
   Workplace Skills (See Appendix B): WP4, WP5, WP6
3. Demonstrate basic techniques used in metal finishing according to industry standards.
   a. Interpret safety rules for using body fillers including protective clothing, procedures, and cautions.
   b. Describe guidelines for mixing and applying body fillers including mixing ratios, mixing procedures, and shop temperature.
   c. Prepare a steel metal panel and use plastic body filler to repair the panel according to industry standards.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M4
   Workplace Skills (See Appendix B): WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Explain procedures for identifying damage and plans for repair of sheet metal.*
   a. Discuss the steps in assessing and repair of automotive body metal damage according to the order of performance.
   b. Identify classes of metal damage including buckle, wrinkle, and gouge.

c. *Describe the purpose of preparing a surface for metal repair including why the surface must be clean.*

2. *Apply the procedures for repair of damaged sheet metal.*
   a. *Demonstrate procedures to prepare exterior and interior metal surfaces for repair including the amount of surface that should be prepared on a exterior and interior panel surface according to industry practices and specifications.*
   b. *Describe the effects of bending automotive body sheet metal including strengthening and weakening of the sheet metal panel.*
   c. *Demonstrate procedures to bump out a panel using a hammer and dolly and bumping or slapping spoon according to industry standards.*
   d. *Identify grinding techniques used in metal finishing including the patterns used to promote adhesion.*
3. *Demonstrate basic techniques used in metal finishing according to industry standards.*
   a. *Discuss safety rules for using body fillers including protective clothing, procedures, and cautions.*
   b. *Describe guidelines for mixing and applying body fillers including mixing ratios, mixing procedures, and shop temperature.*
   c. *Demonstrate procedures to prepare a steel metal panel and use plastic body filler to repair the panel according to industry standards.*

Suggested Assessment Strategies:

1. *Explain procedures for identifying damage and plans for repair of sheet metal.*
   a. *Oral/written Report - Describe the steps in assessing and repair of automotive body metal damage according to the order of performance.*
   b. *Practical Activity - Identify classes of metal damage including buckle, wrinkle, and gouge.*
   c. *Oral/written Report - Describe the purpose of preparing a surface for metal repair including why the surface must be clean.*
2. *Apply the procedures for repair of damaged sheet metal.*
   a. *Practical Activity - Prepare exterior and interior metal surfaces for repair including the amount of surface that should be prepared on an exterior and an interior panel surface according to industry practices and specifications.*
   b. *Oral/written assignment to describe the effects of bending automotive body sheet metal including strengthening and weakening of the sheet metal panel.*
   c. *Practical Activity - Bump out a panel using a hammer and dolly and bumping or slapping spoon according to industry standards.*
   d. *Practical Activity - Identify grinding techniques used in metal finishing including the patterns used to promote adhesion.*

3. *Demonstrate basic techniques used in metal finishing according to industry standards.*
   a. *Practical Activity - Interpret safety rules for using body fillers including protective clothing, procedures, and cautions.*
   b. *Practical Activity - Describe guidelines for mixing and applying body fillers including mixing ratios, mixing procedures, and shop temperature.*
   c. *Practical Activity - Prepare a steel metal panel and use plastic body filler to repair the panel according to industry standards.*

Suggested References:

Eaddy, V. S.. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

AUTOMOTIVE BODY REPAIR I
UNIT 6: PREPARING FOR FINISHING **(50 days)**

Competencies and Suggested Objectives:

1. Apply procedures for sanding and grit selection.
   a. Describe the purposes of sanding including promotion of adhesion and removal of rough surfaces.
   b. Select appropriate grit for the finish being applied.
   c. Describe the purpose of featheredging including tapering of broken paint and sanding scratches.
   d. Compare the characteristics of wet and dry sanding including dust, paper clog, panel inspection, sanding scratches, and speed of masking.
   e. Describe guidelines for hand sanding including sanding in one direction, use of sanding block, and application of even pressure.
   f. Featheredge broken paint according to industry standards.
   g. Wet sand for a complete paint job according to industry standards.
   h. Dry sand for a complete paint job according to industry standards.
   i. Scuff-sand a surface according to industry standards.

   Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S8
   Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6
2. Apply procedures for masking.
   a. Describe guidelines for effective use of masking tape and paper including application and removal.
   b. Mask a vehicle for panel or a complete paint job according to industry standards.

   Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6
   Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Apply procedures for sanding and grit selection.*
   a. Discussion and media to describe the purposes of sanding including promotion of adhesion and removal of rough surfaces.
   b. Demonstrate how to select appropriate grit for the finish being applied.
   c. Discuss the purpose of featheredging including tapering of broken paint and sanding scratches.
   d. Discuss the characteristics of wet and dry sanding including dust, paper clog, panel inspection, sanding scratches, and speed of masking.
   e. Discuss guidelines for hand sanding including sanding in one direction, use of sanding block, and application of even pressure.
   f. Present demonstration of procedures to featheredge broken paint according to industry standards.

g. *Demonstrate procedures to wet sand for a complete paint job according to industry standards.*
h. *Demonstrate procedures to dry sand for a complete paint job according to industry standards.*
i. *Demonstrate procedures to scuff-sand a surface according to industry standards.*

2. *Apply procedures for masking.*
   a. *Discussion and media to describe guidelines for effective use of masking tape and paper including application and removal.*
   b. *Demonstrate procedures to mask a vehicle for panel or a complete paint job according to industry standards.*

Suggested Assessment Strategies:

1. *Apply procedures for sanding and grit selection.*
   a. *Test - Describe the purposes of sanding including promotion of adhesion and removal of rough surfaces.*
   b. *Practical Activity - Select appropriate grit for the finish being applied.*
   c. *Practical Activity - Describe the purpose of featheredging including tapering of broken paint and sanding scratches.*
   d. *Oral/written Report - Compare the characteristics of wet and dry sanding including dust, paper clog, panel inspection, sanding scratches, and speed of masking.*
   e. *Practical Activity - Describe guidelines for hand sanding including sanding in one direction, use of sanding block, and application of even pressure.*
   f. *Practical Activity - Featheredge broken paint according to industry standards.*
   g. *Practical Activity - Wet sand for a complete paint job according to industry standards.*
   h. *Practical Activity - Dry sand for a complete paint job according to industry standards.*
   i. *Practical Activity - Scuff-sand a surface according to industry standards.*
2. *Apply procedures for masking.*
   a. *Test - Describe guidelines for effective use of masking tape and paper including application and removal.*
   b. *Practical Activity - Mask a vehicle for panel or a complete paint job according to industry standards.*

Suggested References:

Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

AUTOMOTIVE BODY REPAIR II

AUTOMOTIVE BODY REPAIR II
UNIT 1: SAFETY (REVIEW) **(5 days)**

Competencies and Suggested Objectives:

1. Explain general shop safety requirements.
   a. Associate the Federal safety colors with their applications including red, green, yellow, black, white, orange, and blue.
   b. Match fire extinguishers to the classes of fire each is best suited to extinguish including Class A (wood), Class B (flammable liquid), and Class C (electrical), and Class D (flammable metals).
   c. Describe state eye safety law, including appropriate times for wearing safety glasses.
   d. Describe rules for personal and general shop safety related to automotive body repair including hygiene, clothing, avoidance of horseplay, shop housekeeping, ventilation, safety equipment, location of fire safety and first aid equipment, shop layout, lifting and hoisting devices, vehicles, flammable liquids, hazardous materials, and pertinent safety codes.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, S4,S5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Describe procedures for dealing with hazardous materials.
   a. Describe the "Right to Know Laws and Regulations" regarding hazardous materials contact.
   b. Describe methods for reducing hazardous waste including (1) substitute non-hazardous materials, (2) recycle waste, (3) re-use product, (4) use only amount of product needed, and (5) avoid stockpiling.
   c. Identify general procedures for storing hazardous materials and wastes including the following: (1) make sure that all containers are properly labeled at all times, (2) mark all containers containing hazardous waste materials with the words **"HAZARDOUS WASTE"** and with the date that the container was first used to store the waste, (3) store wastes and materials as described by the manufacturer, (4) make sure that containers are intact and secure at all times, and (5) keep all containers closed securely except when being filled or emptied.
   d. Identify the informational sections found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.
   e. Describe general first aid procedures to follow in case of an accident involving hazardous materials: (1) move the victim to fresh air; (2) check the container label, Material Safety Data Sheet, or other source for first aid procedures and begin first aid at once; (3) contact the person designated to help with first aid and evacuation procedures; (4) call an ambulance; (5) follow instructions from the designated person concerning further first aid and evacuation measures; (6) remain with the person until the ambulance

arrives; (7) attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.

f. Identify safety equipment to be used with hazardous materials including protection for eyes, respiratory system, body, and hands.
g. Describe steps to follow in handling spills and waste disposal including (1) evacuate the area, (2) read container label, (3) call fire department (if flammable), (4) call manufacturer for clean-up instructions, (5) check Fingertip Retrieval System (FRS) Manual, (6) use proper protection equipment, and (7) contain the flow of waste.
h. Identify agencies to be contacted in case of an accident or for more information on hazardous materials including National Response Center, EPA Regional Office, and Mississippi Department of Natural Resources.

Related Academic Topics (See Appendix A): C3, C4
Workplace Skills (See Appendix B): WP3, WP6

Suggested Teaching Strategies:

1. *Explain general shop safety requirements.*
   a. *Assist students to associate the Federal safety colors with their applications including red, green, yellow, black, white, orange, and blue.*
   b. *Show the student which fire extinguishers are best suited to extinguish which class of fire including Class A (wood), Class B (flammable liquid), and Class C (electrical), and Class D (flammable metals).*
   c. *Discussion and media to describe state eye safety law, including appropriate times for wearing safety glasses.*
   d. *Discussion and media to describe rules for personal and general shop safety related to automotive body repair including hygiene, clothing, avoidance of horseplay, shop housekeeping, ventilation, safety equipment, location of fire safety and first aid equipment, shop layout, lifting and hoisting devices, vehicles, flammable liquids, hazardous materials, and pertinent safety codes.*
2. *Describe procedures for dealing with hazardous materials.*
   a. *Describe the "Right to Know Laws and Regulations" regarding hazardous materials contact.*
   b. *Describe methods for reducing hazardous waste including (1) substitute non-hazardous materials, (2) recycle waste, (3) re-use product, (4) use only amount of product needed, and (5) avoid stockpiling.*
   c. *Demonstrate procedures to identify general procedures for storing hazardous materials and wastes including the following: (1) make sure that all containers are properly labeled at all times, (2) mark all containers containing hazardous waste materials with the words* ***"HAZARDOUS WASTE"*** *and with the date that the container was first used to store the waste, (3) store wastes and materials as described by the manufacturer,*

(4) make sure that containers are intact and secure at all times, and (5) keep all containers closed securely except when being filled or emptied.

d. *Discussion and media to identify the informational sections found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.*
e. *Demonstrate procedures to provide general first aid procedures to follow in case of an accident involving hazardous materials: (1) move the victim to fresh air; (2) check the container label, Material Safety Data Sheet, or other source for first aid procedures and begin first aid at once; (3) contact the person designated to help with first aid and evacuation procedures; (4) call an ambulance; (5) follow instructions from the designated person concerning further first aid and evacuation measures; (6) remain with the person until the ambulance arrives; (7) attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.*
f. *Demonstrate safety equipment to be used with hazardous materials including protection for eyes, respiratory system, body, and hands.*
g. *Demonstrate steps to follow in handling spills and waste disposal including (1) evacuate the area, (2) read container label, (3) call fire department (if flammable), (4) call manufacturer for clean-up instructions, (5) check Fingertip Retrieval System (FRS) Manual, (6) use proper protection equipment, and (7) contain the flow of waste.*
h. *Discussion and media to identify agencies to be contacted in case of an accident or for more information on hazardous materials including National Response Center, EPA Regional Office, and Mississippi Department of Natural Resources.*

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Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

Warzecha, M. Hazardous Materials Fingertip Retrieval System. Alexandria, VA: American Vocational Association. 1991.

AUTOMOTIVE BODY REPAIR II
UNIT 2: HARDWARE, GLASS, FASTENERS, AND TRIM **(10 days)**

Competencies and Suggested Objectives:

1. Explain automotive hardware, glass, fasteners and trim.
   a. Identify typical interior door components and hardware including door handle, door rest, side mirror regulator, window regulator, door knob lock, weather strip, ash tray, and door latch.
   b. Identify typical door glass hardware including regulator, control arms, and glass track.
   c. Identify the weather stripping on a door including how the weather stripping seals the interior from outside elements.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4
   Workplace Skills (See Appendix B): WP2, WP4
2. Apply procedures for disassembly and assembly of manual doors.
   a. Describe the methods used for mounting interior handles including clip-attached and screw-attached types.
   b. Remove and replace interior door trim panel according to manufacturer's specifications using door trim tools.

   Related Academic Topics (See Appendix A): C1, C3, C4
   Workplace Skills (See Appendix B): WP2, WP3, WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Explain automotive hardware, glass, fasteners and trim.*
   a. *Assist students to identify typical interior door components and hardware including door handle, door rest, side mirror regulator, window regulator, door knob lock, weather strip, ash tray, and door latch.*
   b. *Assist students to identify typical door glass hardware including regulator, control arms, and glass track.*
   c. *Assist students to identify the weather stripping on a door including how the weather stripping seals the interior from outside elements.*
2. *Apply procedures for disassembly and assembly of manual doors.*
   a. *Assist students to describe the methods used for mounting interior handles including clip-attached and screw-attached types.*
   b. *Present demonstration of procedures to remove and replace interior door trim panel according to manufacturer's specifications using door trim tools.*

Suggested Assessment Strategies:

1. *Explain automotive hardware, glass, fasteners and trim.*
   a. *Practical Activity - Identify typical interior door components and hardware including door handle, door rest, side mirror regulator, window regulator, door knob lock, weather strip, ash tray, and door latch.*
   b. *Practical Activity - Identify typical door glass hardware including regulator, control arms, and glass track.*
   c. *Practical Activity - Identify the weather stripping on a door including how the weather stripping seals the interior from outside elements.*
2. *Apply procedures for disassembly and assembly of manual doors.*
   a. *Practical Activity - Describe the methods used for mounting interior handles including clip-attached and screw-attached types.*
   b. *Practical Activity - Remove and replace interior door trim panel according to manufacturer's specifications using door trim tools.*

Suggested References:

Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

AUTOMOTIVE BODY REPAIR II
UNIT 3: BODY AND FRAME CONSTRUCTION (10 days)

Competencies and Suggested Objectives:

1. Explain procedures to repair body and frame construction.
   a. Identify major parts of unitized and conventional frames including: (1) unitized parts such as header bar, windshield, pillar, strut tower, front rail, front body, hinge pillar, rocker panel, and center panel and (2) conventional parts such as stud frame section, front cross member, side rail, and rear cross member.
   b. Describe the different types of frame and unitized body damage including diamond, twist, sag, and sway.
   c. Identify the frame repair control points including front, center, and rear.

   Related Academic Topics (See Appendix A): C1, C2, C4, C6
   Workplace Skills (See Appendix B): WP2, WP3, WP6

Suggested Teaching Strategies:

1. *Explain procedures to repair body and frame construction.*
   a. *Discussion and media to identify major parts of unitized and conventional frames including: (1) unitized parts such as header bar, windshield, pillar, strut tower, front rail, front body, hinge pillar, rocker panel, and center panel and (2) conventional parts such as stud frame section, front cross member, side rail, and rear cross member.*
   b. *Discussion and media to describe the different types of frame and unitized body damage including diamond, twist, sag, and sway.*
   c. *Discussion and media to identify the frame repair control points including front, center, and rear.*

Suggested Assessment Strategies:

1. *Explain procedures to repair body and frame construction.*
   a. *Test - Identify major parts of unitized and conventional frames including: (1) unitized parts such as header bar, windshield, pillar, strut tower, front rail, front body, hinge pillar, rocker panel, and center panel and (2) conventional parts such as stud frame section, front cross member, side rail, and rear cross member.*
   b. *Test - Describe the different types of frame and unitized body damage including diamond, twist, sag, and sway.*
   c. *Test - Identify the frame repair control points including front, center, and rear.*

Suggested References:

Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

Mitchell International. Mitchell Collision Manual. San Diego, CA: Author.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

AUTOMOTIVE BODY REPAIR II
UNIT 4: WELDING AND CUTTING APPLICATIONS (10 days)

Competencies and Suggested Objectives:

1. Explain the components of gas metal arc welding (GMAW).
   a. Identify the major components of a GMAW welding unit including solid wire electrode, gas cylinder, timing and control panel, power supply, wire-feed system, torch gun, and ground clamp.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C6, S5, S8
   Workplace Skills (See Appendix B): WP2, WP4
2. Operate a GMAW system.
   a. Set up a spool-type wire feeder for GMAW welding according to industry standards.
   b. Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.
   c. Set up a flowmeter regulator for GMAW shielding gases according to industry standards.
   d. Use a GMAW welder to lay stringer beads, construct a fillet weld, plug weld, and weld a lap joint on automotive type steel.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1,S5, S8
   Workplace Skills (See Appendix B): WP2, WP4
3. Set up and operate a plasma arc cutter (PAC).
   a. Identify the major components of a PAC.
   b. Adjust airflow and temperature settings.
   c. Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.
   d. Operate a PAC to cut automotive body sheet metal.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, S5
   Workplace Skills (See Appendix B): WP2, WP4

Suggested Teaching Strategies:

1. *Explain the components of gas metal arc welding (GMAW).*
   a. *Assist students to identify the major components of a GMAW welding unit including solid wire electrode, gas cylinder, timing and control panel, power supply, wire-feed system, torch gun, and ground clamp.*
2. *Operate a GMAW system.*
   a. *Demonstrate procedures to set up a spool-type wire feeder for GMAW welding according to industry standards.*

b. *Performance exercise to demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.*
c. *Demonstrate procedures to set up a flowmeter regulator for GMAW shielding gases according to industry standards.*
d. *Demonstrate procedures to use a GMAW welder to lay stringer beads, construct a fillet weld, plug weld, and weld a lap joint on automotive type steel.*

3. *Set up and operate a plasma arc cutter (PAC).*
   a. *Identify the major components of a PAC.*
   b. *Demonstrate procedures to adjust airflow and temperature settings.*
   c. *Performance exercise to demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.*
   d. *Demonstrate procedures to operate a PAC to cut automotive body sheet metal.*

Suggested Assessment Strategies:

1. *Explain the components of gas metal arc welding (GMAW).*
   a. *Practical Activity - Identify the major components of a GMAW welding unit including solid wire electrode, gas cylinder, timing and control panel, power supply, wire-feed system, torch gun, and ground clamp.*
2. *Operate a GMAW system.*
   a. *Practical Activity - Set up a spool-type wire feeder for GMAW welding according to industry standards.*
   b. *Performance Activity - Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.*
   c. *Practical Activity - Set up a flowmeter regulator for GMAW shielding gases according to industry standards.*
   d. *Practical Activity - Use a GMAW welder to lay stringer beads, construct a fillet weld, plug weld, and weld a lap joint on automotive type steel.*
3. *Set up and operate a plasma arc cutter (PAC).*
   a. *Practical Activity - Identify the major components of a PAC.*
   b. *Practical Activity - Adjust airflow and temperature settings.*
   c. *Performance Activity - Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.*
   d. *Practical Activity - Operate a PAC to cut automotive body sheet metal.*

Suggested References:

American Welding Society. Safety in Welding, Cutting, and Allied Processes (Z49.1.94). Miami, FL: Author. 1994.

Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

AUTOMOTIVE BODY REPAIR II
UNIT 5: MAJOR DAMAGE REPAIR **(50 days)**

Competencies and Suggested Objectives:

1. Explain choices or options for correction of structural panel damage.
   a. Describe options for repair, replace, or total for correction of structural panel damage.

   Related Academic Topics (See Appendix A): C1, C3, M1
   Workplace Skills (See Appendix B): WP2
2. Explain procedures for heat treating sheet metal panels.
   a. Interpret guidelines for heat shrinking sheet metal including the manufacturer's recommendations for high strength steels.
   b. Observe the proper method for heat shrinking sheet metal according to industry standards.

   Related Academic Topics (See Appendix A): C1, C2, M4, S6
   Workplace Skills (See Appendix B): WP4
3. Explain procedures for repairing major damage.
   a. Describe the different types of structural panel assembly methods.
   b. Describe methods for removing welded panels including a drill, air chisel, saws, and spot weld cutter.
   c. Remove and reinstall bolted on assemblies, including door, trunk lid, and hood.

   Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, M4
   Workplace Skills (See Appendix B): WP5, WP6
4. Apply procedures to perform fiberglass and plastic repairs.
   a. Describe safety precautions to observe when working with fiberglass including wear of rubber gloves and a respirator, work in a well-ventilated area, have fire extinguisher on standby, mix only amount needed, read all instructions on labels, and use thinners with caution.
   b. Describe the advantages of fiberglass in automotive body construction.
   c. Describe the two types of plastics and repair procedures including thermoset plastic and thermoplastic.
   d. Perform a fiberglass repair.

   Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, M4, M7, S5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
5. Apply procedures for alignment of body panels.
   a. Describe the purpose of aligning detachable parts including proper panel gap, seal, and fit.
   b. Align a body panel according to manufacturer's specifications.

   Related Academic Topics (See Appendix A): C1, C2, C3, C5, C6
   Workplace Skills (See Appendix B): WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Explain choices or options for correction of structural panel damage.*
   a. *Discussion and media to describe options for repair, replace, or total for correction of structural panel damage.*
2. *Explain procedures for heat treating sheet metal panels.*
   a. *Discussion and media to interpret guidelines for heat shrinking sheet metal including the manufacturer's recommendations for high strength steels.*
   b. *Have students observe the proper method for heat shrinking sheet metal according to industry standards.*
3. *Explain procedures for repairing major damage.*
   a. *Discussion and media to describe the different types of structural panel assembly methods.*
   b. *Discussion and media to describe methods for removing welded panels including a drill, air chisel, saws, and spot weld cutter.*
   c. *Demonstrate procedures to remove and reinstall bolted on assemblies, including door, trunk lid, and hood.*
4. *Apply procedures to perform fiberglass and plastic repairs.*
   a. *Discussion and media to describe safety precautions to observe when working with fiberglass including wear of rubber gloves and a respirator, work in a well-ventilated area, have fire extinguisher on standby, mix only amount needed, read all instructions on labels, and use thinners with caution.*
   b. *Discuss the advantages of fiberglass in automotive body construction.*
   c. *Discuss the two types of plastics and repair procedures including thermoset plastic and thermoplastic.*
   d. *Demonstrate procedures to perform a fiberglass repair.*
5. *Apply procedures for alignment of body panels.*
   a. *Discussion and media to describe the purpose of aligning detachable parts including proper panel gap, seal, and fit.*
   b. *Demonstrate procedures to align a body panel according to manufacturer's specifications.*

Suggested Assessment Strategies:

1. *Explain choices or options for correction of structural panel damage.*
   a. *Test - Describe options for repair, replace, or total for correction of structural panel damage.*
2. *Explain procedures for heat treating sheet metal panels.*
   a. *Test - Interpret guidelines for heat shrinking sheet metal including the manufacturer's recommendations for high strength steels.*
   b. *Practical exercise to observe the proper method for heat shrinking sheet metal according to industry standards.*

3. *Explain procedures for repairing major damage.*
   a. *Test - Describe the different types of structural panel assembly methods.*
   b. *Test - Describe methods for removing welded panels including a drill, air chisel, saws, and spot weld cutter.*
   c. *Practical Activity - Remove and reinstall bolted on assemblies, including door, trunk lid, and hood.*
4. *Apply procedures to perform fiberglass and plastic repairs.*
   a. *Test - Describe safety precautions to observe when working with fiberglass including wear of rubber gloves and a respirator, work in a well-ventilated area, have fire extinguisher on standby, mix only amount needed, read all instructions on labels, and use thinners with caution.*
   b. *Oral/written Report - Describe the advantages of fiberglass in automotive body construction.*
   c. *Oral/written Report - Describe the two types of plastics and repair procedures including thermoset plastic and thermoplastic.*
   d. *Practical Activity - Perform a fiberglass repair.*
5. *Apply procedures for alignment of body panels.*
   a. *Test - Describe the purpose of aligning detachable parts including proper panel gap, seal, and fit.*
   b. *Practical Activity - Align a body panel according to manufacturer's specifications.*

Suggested References:

Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

AUTOMOTIVE BODY REPAIR II
UNIT 6: REFINISHING AND DETAILING (50 days)

Competencies and Suggested Objectives:

1. Apply procedures for spray painting.
   a. Describe general safety rules for using spray paint equipment including reading labels, safe use of the compressor, avoiding contact with bare skin, turning off power before servicing, using correct electrical outlets, wearing protective clothing and respirator, and proper ventilation requirements.
   b. Describe the tools and equipment used in automotive refinishing including of spray gun, blow gun, air regulator, air compressor, paint paddle, viscosity cup, paint strainer, apron taper, paint booth, and panel drying system.
   c. Identify the parts of a spray gun including air cap, fluid tip, needle valve, fluid adjustment screw, fan adjustment screw, and body.
   d. Set up a spray gun: (1) thin the paint; (2) fill the spray gun; and (3) set for correct pressure, fan pattern, and fluid flow according to manufacturer's specifications and industry standards.
   e. Clean a spray gun according to manufacturer's specifications.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M4, S5, S8

   Workplace Skills (See Appendix B): WP4, WP5
2. Explain different types of paints and undercoatings.
   a. Describe the different types of paint undercoats and guidelines for quality undercoating including primer, primer surfacer, primer sealer, non-sanding sealers, and etching primers.
   b. Describe procedures for quality undercoating according to industry standards.
   c. Describe the types of finishes used on today's vehicles including acrylic, enamel, urethane, and acrylic urethane.
   d. Describe the different types of coat application techniques including mist coat, single coat, medium wet coat, double coat, and banding coat.

   Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S5

   Workplace Skills (See Appendix B): WP2, WP4
3. Perform application of paints and undercoatings.
   a. Describe guidelines for preventing dirty paint including keeping vehicle clean, wetting paint booth floor, using clean equipment, wearing clean clothes, using clean gun, and using clean masking materials.
   b. Mix and apply a primer-surfacer, guide coat, and sealer according to manufacturer's specifications.
   c. Participate in a complete paint job according to industry standards and paint manufacturer's specifications.

d. Measure paint thickness using a mil gauge.

Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, M1, M4, S5
Workplace Skills (See Appendix B): WP4, WP5

4. Apply automotive detailing procedures.
   a. Describe safety precautions to observe when using volatile cleaners including wearing gloves, safety glasses, particle mask, and protective clothing and having a well-ventilated area.
   b. Detail a complete body paint job according to industry standards and instructor's satisfaction.

Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S5
Workplace Skills (See Appendix B): WP2, WP3, WP4, WP5, WP6

Suggested Teaching Strategies:

1. *Apply procedures for spray painting.*
   a. *Discussion and media to describe general safety rules for using spray paint equipment including reading labels, safe use of the compressor, avoiding contact with bare skin, turning off power before servicing, using correct electrical outlets, wearing protective clothing and respirator, and proper ventilation requirements.*
   b. *Discussion and media to describe the tools and equipment used in automotive refinishing including spray gun, blow gun, air regulator, air compressor, paint paddle, viscosity cup, paint strainer, apron taper, paint booth, and panel drying system.*
   c. *Assist students to identify the parts of a spray gun including air cap, fluid tip, needle valve, fluid adjustment screw, fan adjustment screw, and body.*
   d. *Demonstrate procedures to set up a spray gun: (1) thin the paint; (2) fill the spray gun; and (3) set for correct pressure, fan pattern, and fluid flow according to manufacturer's specifications and industry standards.*
   e. *Demonstrate procedures to clean a spray gun according to manufacturer's specifications.*
2. *Explain different types of paints and undercoatings.*
   a. *Discussion and media to describe the different types of paint undercoats and guidelines for quality undercoating including primer, primer surfacer, primer sealer, non-sanding sealers, and etching primers.*
   b. *Discussion and media to describe procedures for quality undercoating according to industry standards.*
   c. *Discussion and media to describe the types of finishes used on today's vehicles including acrylic, enamel, urethane, and acrylic urethane.*
   d. *Discussion and media to describe the different types of coat application techniques including mist coat, single coat, medium wet coat, double coat, and banding coat.*

3. *Perform application of paints and undercoatings.*
   a. *Discussion and media to describe guidelines for preventing dirty paint including keeping vehicle clean, wetting paint booth floor, using clean equipment, wearing clean clothes, using clean gun, and using clean masking materials.*
   b. *Demonstrate procedures to mix and apply a primer-surfacer, guide coat, and sealer according to manufacturer's specifications.*
   c. *Assist students to participate in a complete paint job according to industry standards and paint manufacturer's specifications.*
   d. *Demonstrate procedures to measure paint thickness using a mil gauge.*
4. *Apply automotive detailing procedures.*
   a. *Discussion and media to describe safety precautions to observe when using volatile cleaners including wearing gloves, safety glasses, particle mask, and protective clothing and having a well-ventilated area.*
   b. *Demonstrate procedures to detail a complete body paint job according to industry standards and instructor's satisfaction.*

Suggested Assessment Strategies:

1. *Apply procedures for spray painting.*
   a. *Test - Describe general safety rules for using spray paint equipment including reading labels, safe use of the compressor, avoiding contact with bare skin, turning off power before servicing, using correct electrical outlets, wearing protective clothing and respirator, and proper ventilation requirements.*
   b. *Test - Describe the tools and equipment used in automotive refinishing including spray gun, blow gun, air regulator, air compressor, paint paddle, viscosity cup, paint strainer, apron taper, paint booth, and panel drying system.*
   c. *Practical Activity - Identify the parts of a spray gun including air cap, fluid tip, needle valve, fluid adjustment screw, fan adjustment screw, and body.*
   d. *Practical Activity - Set up a spray gun: (1) thin the paint; (2) fill the spray gun; and (3) set for correct pressure, fan pattern, and fluid flow according to manufacturer's specifications and industry standards.*
   e. *Practical Activity - Clean a spray gun according to manufacturer's specifications.*
2. *Explain different types of paints and undercoatings.*
   a. *Test - Describe the different types of paint undercoats and guidelines for quality undercoating including primer, primer surfacer, primer sealer, non-sanding sealers, and etching primers.*
   b. *Test - Describe procedures for quality undercoating according to industry standards.*
   c. *Test - Describe the types of finishes used on today's vehicles including acrylic, enamel, urethane, and acrylic urethane.*

d. Test - Describe the different types of coat application techniques including mist coat, single coat, medium wet coat, double coat, and banding coat.

3. Perform application of paints and undercoatings.

a. Test - Describe guidelines for preventing dirty paint including keeping vehicle clean, wetting paint booth floor, using clean equipment, wearing clean clothes, using clean gun, and using clean masking materials.

b. Practical Activity - Mix and apply a primer-surfacer, guide coat, and sealer according to manufacturer's specifications.

c. Practical Activity - Participate in a complete paint job according to industry standards and paint manufacturer's specifications.

d. Practical Activity - Measure paint thickness using a mil gauge.

4. Apply automotive detailing procedures.

a. Test - Describe safety precautions to observe when using volatile cleaners including wearing gloves, safety glasses, particle mask, and protective clothing and having a well-ventilated area.

b. Practical Activity - Detail a complete body paint job according to industry standards and instructor's satisfaction.

Suggested References:

Eaddy, V. S. V-TECS Product Elements for Automotive Body Repair. Mississippi State, MS: Research and Curriculum Unit for Vocational and Technical Education and Mississippi Department of Education. 1993.

I-CAR. Advance-Tech: Automotive Collision Repair Technology Curriculum. Rolling Meadows, IL: I-CAR Educational Foundation. 1995.

I-CAR. How to Establish and Operate a Successful Collision Repair Training Program. Rolling Meadows, IL: I-CAR Educational Foundation. 1993.

I-CAR. Unibody Collision Repair. Albany, NY: Delmar. 1993.

Instructional Materials Laboratory. Automotive Body Repair Curriculum Guide Modules 1-7. Columbia, MO: University of Missouri. 1992.

NATEF. Applied Academic and Workplace Skills for Collision Repair and Refinish Technicians. Herndon, VA: National Automotive Technician Educational Foundation. 1995.

NATEF. ASE Program Certification Standards: Collision Repair and Refinish Technician Training Programs. Herndon, VA: National Automotive Technician Educational Foundation. 1993.

Scharff, R. Motor Automotive Body Repair (2nd ed.). Albany, NY: Delmar. 1992.

SECTION III:

RECOMMENDED TOOLS AND EQUIPMENT

RECOMMENDED TOOLS AND EQUIPMENT FOR AUTOMOTIVE BODY REPAIR

1. Bench, steel work (6)
2. Blade, razor scraper (5)
3. Block, sanding short (6)
4. Block, sanding long (6)
5. Board, file (6)
6. Booth, down draft heated paint (1)
7. Brush, striping (1)
8. Brush, wire (4)
9. Cables, jumper (1)
10. Chains, bumper (1)
11. Charger, battery (1)
12. Chisel set, assorted metal (1)
13. Chuck, air (2)
14. Clamp, welder (vise grip) (6)
15. Clamp, sheet metal (vise grip) (6)
16. Clamp set, assorted body (2)
17. Clamp, C-clamp (vise grip) (3") (2)
18. Clamp, C-clamp (vise grip) (7") (2)
19. Clamp, C-clamp (vise grip) (11") (2)
20. Clamp, C-clamp (vise grip) (18") (2)
21. Cleaner, high pressure (1)
22. Cleaner, vacuum (1)
23. Come-along (2T) (2)
24. Compressor, air (25 hp screw) (1)
25. Computer w/operating software w/multimedia kit (1)
26. Cord, extension (50') (4)
27. Cover, fender (4)
28. Cover, wheel (set of 4) (2)
29. Cup, viscosity (#2 Zahn) (1)
30. Cutter, sheet metal, hand (2)
31. Cutter, sheet metal, power (1)
32. Cutter set, panel (air drive) (1)
33. Cutter, disc (1)
34. Dollies set, assorted (4)
35. Drill, electric (3/8") (1)
36. Drill set, twist (2)
37. Drill, pneumatic (3/8") (2)
38. Drill, electric (½") (1)
39. Driver, hand impact (3/8" drive) (3)
40. Dryer, infrared paint (4)
41. Extractor set, screw (Easy Out) (1)

42. File, air (orbital or straight line) (6)
43. File, body round (2)
44. File, body flat (2)
45. Gauge, tram (1)
46. Gauge set of 4, center line (1)
47. Gloves, cutting goggles (4)
48. Gloves, pair welding (4)
49. Goggles, safety (6)
50. Grater, cheese (24)
51. Grinder, bench (1)
52. Gun, air dusting (4)
53. Gun, spray enamel nozzle (2)
54. Gun, spray (basecoat/clearcoat) (2)
55. Gun, spray detail (1)
56. Gun, spray (primer) (3)
57. Gun, sandblast (1)
58. Gun, heat (1)
59. Gun, staple (1)
60. Gun, caulking (2)
61. Hacksaw (2)
62. Hammer, machinist (4)
63. Hammer set, body (4)
64. Hammer, slide large (snatch bar) (2)
65. Hammer, slide small (snatch bar) (2)
66. Hammer, sledge (1)
67. Headlight set, aiming (1)
68. Helmet, welding (4)
69. Hoist, chain or pneumatic (2T) (1)
70. Hose, air w/quick couplings (50') (20)
71. Jack, floor w/casters (2T) (4)
72. Jack, mechanical (1)
73. Jack, twin saddle (1)
74. Jack, body and fender (10T) (1)
75. Jack, body and fender w/attachments (4T) (1)
76. Jigsaw, (2)
77. Jitterbug, orbital (4)
78. Knife, putty (1 ½") (2)
79. Knife, putty (3") (2)
80. Knife, putty (2") (2)
81. Light, flash (2)
82. Light, extension (3)
83. Machine, masking (2)
84. Mallet, rubber (2)
85. Mallet, plastic (1)

86. Mask, particle (4 boxes)
87. Oiler (1)
88. Pan, drain (2)
89. Picks, assorted (2)
90. Plasma arc cutting equipment (1)
91. Pliers, hog ring (1)
92. Pliers set, assorted (3)
93. Pliers, drip molding (2)
94. Pliers, vise grip (10)
95. Polisher, power (variable speed up to 2,000 rpm) (2)
96. Printer, dot matrix (1)
97. Puller, fuse (1)
98. Punch set, metal assorted (1)
99. Rag, tack (20)
100. Regulator, air w/extractors (12)
101. Respirator, fresh air supply (4 man system) (1)
102. Rod, tram (1)
103. Sander, dual action (6") (8)
104. Sander/Grinder, automotive disc electric (2)
105. Sander, dual action (8") (2)
106. Sander/Grinder, automotive disc pneumatic (2)
107. Saw set, hole assorted (1)
108. Saw, reciprocating (1)
109. Screwdriver set, Phillips (#1,2,3,4) (4)
110. Screwdriver set, Torx (#5-27) (2)
111. Screwdriver set, clutch (1)
112. Screwdriver set, flat blade (6)
113. Scribe (scratch awl) (4)
114. Shaker, paint (1)
115. Soldering kit (gun or iron) (1)
116. Spoons, assorted (1)
117. Spreader, plastic (50)
118. Stands, adjustable (20)
119. Strap, fender pull (1)
120. Tap and die set (standard) (1)
121. Tap and die set (metric) (1)
122. Tape, steel (25') (2)
123. Tester, circuit load (1)
124. Tester, multimeter (VOM) (1)
125. Tester, radiator pressure (1)
126. Tool, door handle clip remover (2)
127. Tool, door handle pin removing (1)
128. Tool, pop rivet, large (2)
129. Tool, pop rivet, small (2)

130. Tool, magnetic pickup (2)
131. Torx driver set (1/4" and 3/8" drive #5-55) (2)
132. Tubing set, flaring tool (1)
133. Vise (5") (4)
134. Welder, spot (resistance gun) (1)
135. Welder, GMAW (220V) (150 Amp) (1)
136. Welder set, oxyacetylene w/cutting torch (1)
137. Welder, GMAW (220V) (225 Amp) (1)
138. Wrench set, combination metric (5mm - 21mm) (2)
139. Wrench, pneumatic ratchet (1/4" drive) (1)
140. Wrench, pneumatic ratchet (3/8" drive) (1)
141. Wrench, pneumatic impact (3/8" butterfly) (2)
142. Wrench, pneumatic impact (½") (1)
143. Wrench set, box end (3/16" - 1 1/4") (1)
144. Wrench, pneumatic impact (3/8" standard) (1)
145. Wrench set, socket (1/4", 3/8", and ½" drive) (4)
146. Wrench set, Allen (2)
147. Wrench set, combination SAE (3/16" - 1 1/4") (4)

RECOMMENDED INSTRUCTIONAL AIDS

1. Calculator (1)
2. Cart, AV (for overhead projector) (1)
3. Cart, AV (for TV-VCR) (1)
4. Projector, overhead (1)
5. TV-VCR (1)
6. Video out (Microcomputer to TV monitor) (1)

APPENDIX A:

RELATED ACADEMIC TOPICS

APPENDIX A

RELATED ACADEMIC TOPICS FOR COMMUNICATIONS

C1 Interpret written material.
C2 Interpret visual materials (maps, charts, graphs, tables, etc.).
C3 Listen, comprehend, and take appropriate actions.
C4 Access, organize, and evaluate information.
C5 Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.
C6 Communicate ideas and information effectively using various oral and written forms for a variety of audiences and purposes.

EXPANDED TOPICS FOR COMMUNICATIONS

TOPIC C1: Interpret written material.

C1.01 Read and follow complex written directions.
C1.02 Recognize common words and meanings associated with a variety of occupations.
C1.03 Adjust reading strategy to purpose and type of reading.
C1.04 Use sections of books and reference sources to obtain information.
C1.05 Compare information from multiple sources and check validity.
C1.06 Interpret items and abbreviations used in multiple forms.
C1.07 Interpret short notes, memos, and letters.
C1.08 Comprehend technical words and concepts.
C1.09 Use various reading techniques depending on purpose for reading.
C1.10 Find, read, understand, and use information from printed matter or electronic sources.

TOPIC C2: Interpret visual materials (maps, charts, graphs, tables, etc.).

C2.01 Use visuals in written and in oral presentations.
C2.02 Recognize visual cues to meaning (layout, typography, etc.).
C2.03 Interpret and apply information using visual materials.

TOPIC C3: Listen, comprehend, and take appropriate action.

C3.01 Identify and evaluate orally-presented messages according to purpose.
C3.02 Recognize barriers to effective listening.
C3.03 Recognize how voice inflection changes meaning.
C3.04 Identify speaker signals requiring a response and respond accordingly.
C3.05 Listen attentively and take accurate notes.
C3.06 Use telephone to receive information.

C3.07 Analyze and distinguish information from formal and informal oral presentations.

TOPIC C4: Access, organize, and evaluate information.

C4.01 Distinguish fact from opinion.
C4.02 Use various print and non-print sources for specialized information.
C4.03 Interpret and distinguish between literal and figurative meaning.
C4.04 Interpret written or oral communication in relation to context and writer's point of view.
C4.05 Use relevant sources to gather information for written or oral communication.

TOPIC C5: Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.

C5.01 Select appropriate words for communication needs.
C5.02 Use reading, writing, listening, and speaking skills to solve problems.
C5.03 Compose inquiries and requests.
C5.04 Write persuasive letters and memos.
C5.05 Edit written reports, letters, memos, and short notes for clarity, correct grammar, and effective sentences.
C5.06 Write logical and understandable statements, phrases, or sentences for filling out forms, for correspondence or reports.
C5.07 Write directions or summaries of processes, mechanisms, events, or concepts.
C5.08 Select and use appropriate formats for presenting reports.
C5.09 Convey information to audiences in writing.
C5.10 Compose technical reports and correspondence that meet accepted standards for written communications.

TOPIC C6: Communicate ideas and information using oral and written forms for a variety of audiences and purposes.

C6.01 Give complex oral instructions.
C6.02 Describe a business or industrial process/mechanism.
C6.03 Participate effectively in group discussions and decision making.
C6.04 Produce effective oral messages utilizing different media.
C6.05 Explore ideas orally with partners.
C6.06 Participate in conversations by volunteering information when appropriate and asking relevant questions when appropriate.
C6.07 Restate or paraphrase a conversation to confirm one's own understanding.
C6.08 Gather and provide information utilizing different media.

C6.09 Prepare and deliver persuasive, descriptive, and demonstrative oral presentations.

RELATED ACADEMIC TOPICS FOR MATHEMATICS

M1 Relate number relationships, number systems, and number theory.
M2 Explore patterns and functions.
M3 Explore algebraic concepts and processes.
M4 Explore the concepts of measurement.
M5 Explore the geometry of one-, two-, and three-dimensions.
M6 Explore concepts of statistics and probability in real world situations.
M7 Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

EXPANDED TOPICS FOR MATHEMATICS

TOPIC M1: Relate number relationships, number systems, and number theory.

M1.01 Understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, and scientific notation) in real world and mathematical problem situations.
M1.02 Develop number sense for whole numbers, fractions, decimals, integers, and rational numbers.
M1.03 Understand and apply ratios, proportions, and percents in a wide variety of situations.
M1.04 Investigate relationships among fractions, decimals, and percents.
M1.05 Compute with whole numbers, fractions, decimals, integers, and rational numbers.
M1.06 Develop, analyze, and explain procedures for computation and techniques for estimations.
M1.07 Select and use an appropriate method for computing from among mental arithmetic, paper-and-pencil, calculator, and computer methods.
M1.08 Use computation, estimation, and proportions to solve problems.
M1.09 Use estimation to check the reasonableness of results.

TOPIC M2: Explore patterns and functions.

M2.01 Describe, extend, analyze, and create a wide variety of patterns.
M2.02 Describe and represent relationships with tables, graphs, and rules.
M2.03 Analyze functional relationships to explain how a change in one quantity results in a change in another.
M2.04 Use patterns and functions to represent and solve problems.
M2.05 Explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations.

M2.06 Use a mathematical idea to further their understanding of other mathematical ideas.
M2.07 Apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, and business.

TOPIC M3: Explore algebraic concepts and processes.

M3.01 Represent situations and explore the interrelationships of number patterns with tables, graphs, verbal rules, and equations.
M3.02 Analyze tables and graphs to identify properties and relationships and to interpret expressions and equations.
M3.03 Apply algebraic methods to solve a variety of real world and mathematical problems.

TOPIC M4: Explore the concepts of measurement.

M4.01 Estimate, make, and use measurements to describe and compare phenomena.
M4.02 Select appropriate units and tools to measure to the degree of accuracy required in a particular situation.
M4.03 Extend understanding of the concepts of perimeter, area, volume, angle measure, capacity, and weight and mass.
M4.04 Understand and apply reasoning processes, with special attention to spatial reasoning and reasoning with proportions and graphs.

TOPIC M5: Explore the geometry of one-, two-, and three-dimensions.

M5.01 Identify, describe, compare, and classify geometric figures.
M5.02 Visualize and represent geometric figures with special attention to developing spatial sense.
M5.03 Explore transformations of geometric figures.
M5.04 Understand and apply geometric properties and relationships.
M5.05 Classify figures in terms of congruence and similarity and apply these relationships.

TOPIC M6: Explore the concepts of statistics and probability in real world situations.

M6.01 Systematically collect, organize, and describe data.
M6.02 Construct, read, and interpret tables, charts, and graphs.
M6.03 Develop an appreciation for statistical methods as powerful means for decision making.
M6.04 Make predictions that are based on exponential or theoretical probabilities.

M6.05 Develop an appreciation for the pervasive use of probability in the real world.

TOPIC M7: Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

M7.01 Use computers and/or calculators to process information for all mathematical situations.
M7.02 Use problem-solving approaches to investigate and understand mathematical content.
M7.03 Formulate problems from situations within and outside mathematics.
M7.04 Generalize solutions and strategies to new problem situations.

RELATED ACADEMIC TOPICS FOR SCIENCE

S1 Explain the Anatomy and Physiology of the human body.
S2 Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.
S3 Relate the nine major phyla of the kingdom animalia according to morphology, anatomy, and physiology.
S4 Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.
S5 Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.
S6 Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.
S7 Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance, population genetics, the structure and function of DNA, and current applications of DNA technology.
S8 Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

EXPANDED TOPICS FOR SCIENCE

TOPIC S1: Explain the Anatomy and Physiology of the human body.

S1.01 Recognize common terminology and meanings.
S1.02 Explore the relationship of the cell to more complex systems within the body.

S1.03 Summarize the functional anatomy of all the major body systems.
S1.04 Relate the physiology of the major body systems to its corresponding anatomy.
S1.05 Compare and contrast disease transmission and treatment within each organ system.
S1.06 Explore the usage of medical technology as related to human organs and organ systems.
S1.07 Explain the chemical composition of body tissue.

TOPIC S2: Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.

S2.01 Identify the major types and structures of plants, viruses, monera, algae protista, and fungi.
S2.02 Explain sexual and asexual reproduction.
S2.03 Describe the ecological importance of plants as related to the environment.
S2.04 Analyze the physical chemical and behavioral process of a plant.

TOPIC S3: Relate the nine major phyla of the kingdom animalia according to morphology, anatomy, and physiology.

S3.01 Explain the morphology, anatomy, and physiology of animals.
S3.02 Describe the characteristics, behaviors, and habitats of selected animals.

TOPIC S4: Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.

S4.01 Examine minerals and their identification, products of the rock cycle, byproducts of weathering, and the effects of erosion.
S4.02 Relate the Hydrologic Cycle to include groundwater its zones, movement, and composition; surface water systems, deposits, and runoff.
S4.03 Consider the effects of weather and climate on the environment.
S4.04 Examine the composition of seawater; wave, tides, and currents; organisms, environment, and production of food; energy, food and mineral resources of the oceans.

TOPIC S5: Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.
S5.01 Examine the science of chemistry to include the nature of matter, symbols, formulas and nomenclature, and chemical equations.

S5.02 Identify chemical reactions including precipitation, acids-bases, and reduction-oxidation.
S5.03 Explore the fundamentals of chemical bonding and principles of equilibrium.
S5.04 Relate the behavior of gases.
S5.05 Investigate the structure, reactions, and uses of organic compounds; and investigate nuclear chemistry and radiochemistry.

TOPIC S6: Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.

S6.01 Examine fundamentals of motion of physical bodies and physical dynamics.
S6.02 Explore the concepts and relationships among work, power, and energy.
S6.03 Explore principles, characteristics, and properties of electricity, magnetism, light energy, thermal energy, and wave energy.
S6.04 Identify principles of modern physics related to nuclear physics.

TOPIC S7: Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance; population genetics, the structure and function of DNA, and current applications of DNA technology.

S7.01 Examine principles, techniques, and patterns of traits and inheritance in organisms.
S7.02 Apply the concept of population genetics to both microbial and multicellular organism.
S7.03 Identify the structure and function of DNA and the uses of DNA technology in science, industry, and society.

TOPIC S8: Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

S8.01 Apply the components of scientific processes and methods in classroom and laboratory investigations.
S8.02 Observe and practice safe procedures in the classroom and laboratory.
S8.03 Demonstrate proper use and care for scientific equipment.
S8.04 Investigate science careers, and advances in technology.
S8.05 Communicate results of scientific investigations in oral, written, and graphic form.

APPENDIX B:

WORKPLACE SKILLS

APPENDIX B
WORKPLACE SKILLS FOR THE 21ST CENTURY

WP1 Allocates resources (time, money, materials and facilities, and human resources).

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.

WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.

WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.

WP5 Selects, applies, and maintains/troubleshoots technology.

WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.

APPENDIX C:

STUDENT COMPETENCY PROFILE

STUDENT COMPETENCY PROFILE
FOR AUTOMOTIVE BODY REPAIR I

Student: _____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

Unit 1: Introduction and Safety

_____ 1. Explain career opportunities for persons in automotive body repair.
_____ 2. Explain general shop safety requirements.
_____ 3. Describe procedures for dealing with hazardous materials.
_____ 4. Explain the programs and activities of VICA which are beneficial to students in automotive body repair.

Unit 2: Basic Tool Usage and Safety

_____ 1. Explain the safe use of general hand tools used in automotive body repair.
_____ 2. Explain the safe use of power tools and stationary equipment.

Unit 3: Body and Frame Construction Components

_____ 1. Explain components of automotive body construction.
_____ 2. Describe body and frame components using automotive reference texts and collision repair manuals.

Unit 4: Principles of Welding

_____ 1. Explain safe use of oxyacetylene cutting equipment.
_____ 2. Utilize oxyacetylene cutting equipment.
_____ 3. Explain the principles of operation of gas metal arc welding (GMAW).

Unit 5: Basic Sheet Metal Repair

_____ 1. Explain procedures for identifying damage and plans for repair of sheet metal.
_____ 2. Apply the procedures for repair of damaged sheet metal.

_____ 3. Demonstrate basic techniques used in metal finishing according to industry standards.

Unit 6: Preparing for Finishing

_____ 1. Apply procedures for sanding and grit selection.
_____ 2. Apply procedures for masking.

STUDENT COMPETENCY PROFILE
FOR AUTOMOTIVE BODY REPAIR II

Student: _____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

Unit 1: Safety (Review)

_____ 1. Explain general shop safety requirements.
_____ 2. Describe procedures for dealing with hazardous materials.

Unit 2: Hardware, Glass, Fasteners, and Trim

_____ 1. Explain automotive hardware, glass, fasteners and trim.
_____ 2. Apply procedures for disassembly and assembly of manual doors.

Unit 3: Body and Frame Construction

_____ 1. Explain procedures to repair body and frame construction.

Unit 4: Welding and Cutting Applications

_____ 1. Explain the components of gas metal arc welding (GMAW).
_____ 2. Operate a GMAW system.
_____ 3. Set up and operate a plasma arc cutter (PAC).

Unit 5: Major Damage Repair

_____ 1. Explain choices or options for correction of structural panel damage.
_____ 2. Explain procedures for heat treating sheet metal panels.
_____ 3. Explain procedures for repairing major damage.
_____ 4. Apply procedures to perform fiberglass and plastic repairs.
_____ 5. Apply procedures for alignment of body panels.

Unit 6: Refinishing and Detailing

_____ 1. Apply procedures for spray painting.
_____ 2. Explain different types of paints and undercoatings.

_____ 3. Perform application of paints and undercoatings.
_____ 4. Apply automotive detailing procedures.